



Bitterbrush Rehabilitation Squaw Butte Fire Complex



by
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**BITTERBRUSH REHABILITATION:
SQUAW BUTTE FIRE COMPLEX**

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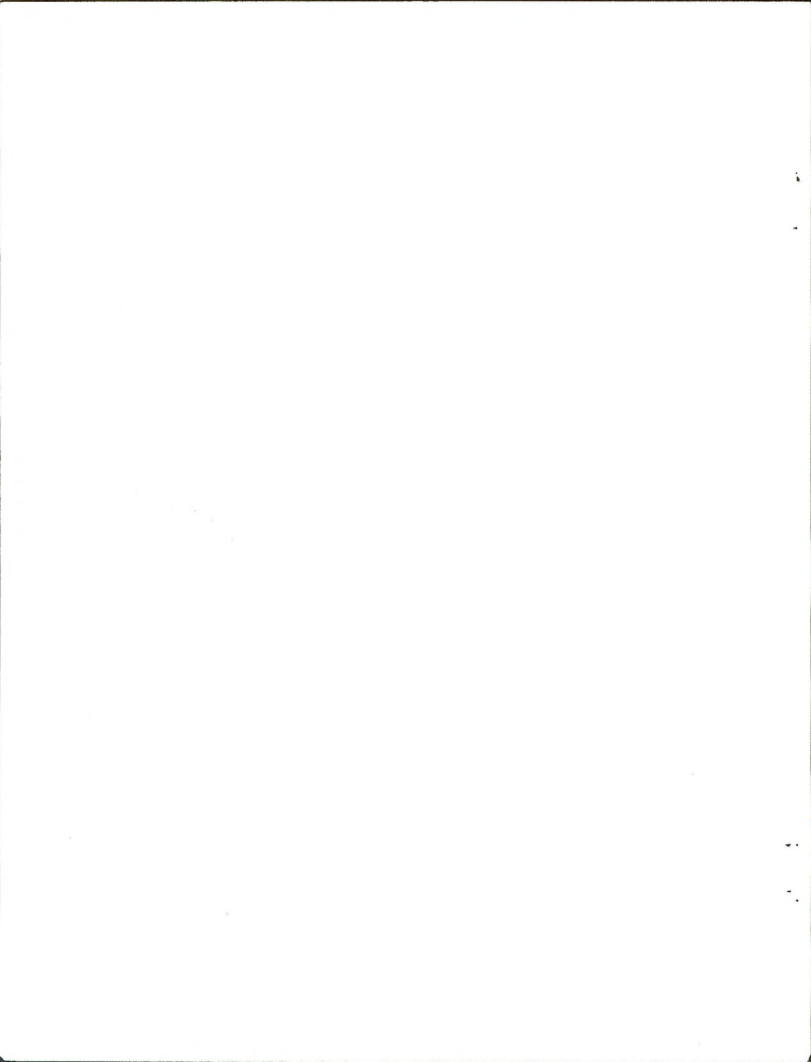
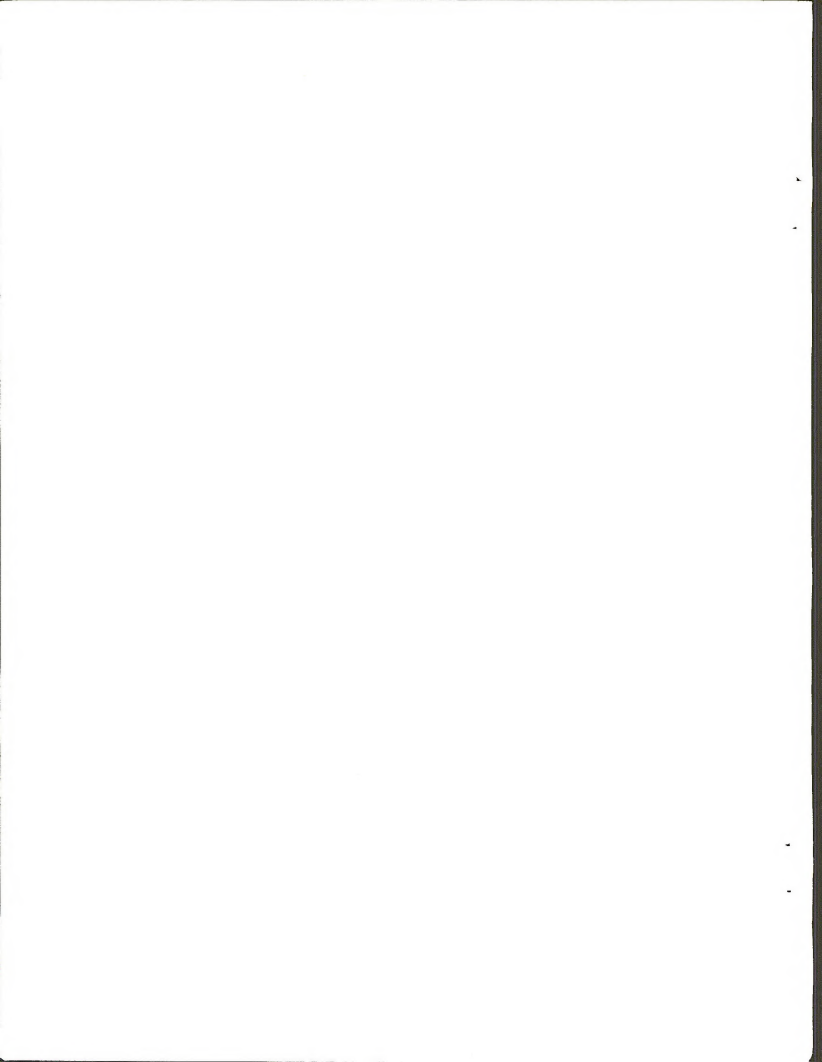


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INTRODUCTION

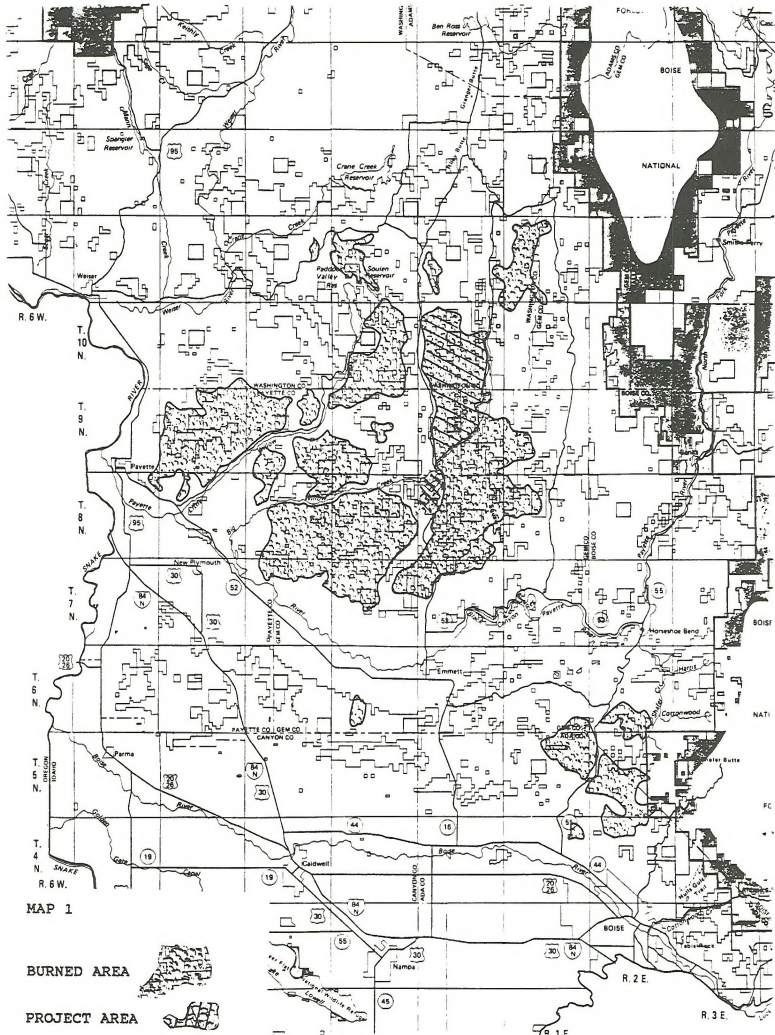
The Squaw Butte Fire Complex resulted from an unprecedented amount of lightning activity during a 10 day period from August 2 to August 12, 1986. During this period, more than 30 separate wildfires were ignited and burned in a rough triangle between Boise, Payette and Weiser, Idaho. The fires burned approximately 220,000 acres which included 90,000 acres of public land, 12,000 acres of State of Idaho lands and 118,000 acres of private lands.

The main concerns generated by these fires were:

1. The destruction of 107,000 acres of crucial mule deer and elk winter range. Approximately 65% of these acres were public lands. (Map 1)
2. The loss of winter forage for 5,000 to 7,000 mule deer and 200 to 400 elk that wintered in the area.
3. Damage to many watersheds and the possibility of erosion and sediment yields due to the lack of vegetative shielding.
4. The conversion of perennial bunchgrass range to exotic annual species and loss of biological diversity.

The woody vegetation species consumed by fire in this area included sagebrush (Artemisia tridentata Nutt.), antelope bitterbrush (Purshia tridentata (Pursh) D.C.), chokecherry (Prunus virginiana L.), willow (Salix spp.), quaking aspen (Populus tremuloides Michx.) and other mountain shrub species. In 1986, the Idaho Department of Fish and Game considered the loss of this winter range as the worst wildlife disaster in Idaho in the past 20 years.

In September of 1986, the Squaw Butte area experienced above normal precipitation followed by above normal temperatures in October and November. This produced an estimated 70% canopy cover of perennial and annual grasses. This reduced the threat of erosion and decreased the number of acres initially scheduled to be aerial seeded.



MAP 1

BURNED AREA



PROJECT AREA



In December of 1986, the Squaw Butte Emergency Fire Rehabilitation (EFR) Plan was completed for the Squaw Butte Complex fires. A nine member Squaw Butte Rehabilitation Committee was formed representing conservation organizations, hunting groups, the livestock industry, academia, general public, Idaho Fish and Game, Bureau of Land Management, and the Idaho Cattle Association. The committee reviewed proposed rehabilitation efforts to ensure that all resources had equal consideration in management decisions. The EFR plan provided funding for the rehabilitation efforts for 1987 and 1988. The immediate goal of this plan was to minimize short and long term soil erosion and sediment yields by enhancing vegetative cover in the area. The long term goals were to reestablish the shrub component in the crucial big game winter range and restore the habitat for other wildlife species utilizing the area.

Due to the importance of the area, an additional Squaw Butte/Willow Ridge Restoration Plan was completed in 1989. This plan identified the need for a continuous effort to reestablish the lost shrub component of the area. The goals of this plan were:

1. Maintain soil stability by restoring and improving vegetative communities in high erosion areas.
2. Reduce fire hazard/loss from future fires through greenstripping projects.
3. Reestablish the quality of big game winter habitat through shrub planting projects.
4. Restore and improve riparian zones damaged by the fires through fencing and shrub/tree planting projects.
5. Restore and improve habitat for upland and non-game species utilizing the area by addressing habitat needs for these species in all planned projects.

Purpose

The purpose of this document is to provide information on techniques for rehabilitation and restoration efforts of bitterbrush and sagebrush stands through contract seedling planting. The planting projects proceeded for five years, beginning in the fall of 1987 and ending in the spring of 1992. We used one year old bare root seedlings (except for Fall 1987) obtained from various nurseries in the region. The bitterbrush seed source was the Boise Foothills, north and adjacent to the city of Boise, Idaho. This area is comparable in soils, elevation and vegetation to the area impacted by the fires. The seed source for the sagebrush was Hobble Creek, Utah. This form of low elevation Mountain Big sagebrush, known as Hobble Creek Sage, is a selection valued for its palatability and nutritive value for wintering mule deer. Literature indicated that this selection would be adapted to the area (Welch, et. al. 1986).

Squaw Butte Rehab Profile

The most important objective of this rehabilitation effort was the protection of the watershed by maintaining soil stability. Potential problem areas were aerial seeded to reduce the possibility of erosion. The following is a compilation of all projects completed during the rehab effort. It also interprets various difficulties, obstacles and achievements encountered managing contracts, contractors, plants, equipment and other variables in a year by year narrative.

Fall 1986:

The first effort was to rehabilitate 120 miles (180 acres) of fire suppression break lines (aerial seeded, chain drag) which occurred immediately after the fire. In a high risk area, approximately 2,100 acres were aerial seeded in late fall using a grass/forb/shrub mixture to prevent the possibility of spring erosion. Approximately 166 miles of existing fence were surveyed and some reconstruction completed. Another 13 miles of new fence was constructed to protect burned areas from livestock grazing. The fencing was a Cost/Share

project, the labor for the construction was donated by the grazing permittee, materials by the Bureau. To limit or prohibit ORV use on the burned areas, 50 signs were installed at key areas.

Spring 1987:

To prevent erosion problems, 3500 acres were aerially seeded, grass/forb/shrub mixture (Appendix B). To initiate shrub rehab efforts, 8,000 acres of sagebrush seed was aerially applied. In another project, bitterbrush seed was mechanically seeded using dribblers on 1,100 acres. Volunteers also planted bitterbrush seeds on 435 acres (4800 volunteer hours). Mountain shrub seedlings were planted on 53 acres and riparian shrub seedlings were established along one mile of drainage bottoms. A research agreement was established with the University of Idaho to examine the effectiveness of the planting techniques used during rehab efforts (Jirik and Bunting, 1989).

Fall 1987:

The first shrub planting that was described in the Squaw Butte EFR plan was originally scheduled for the spring of 1987. Seedlings could not meet minimum specifications (Appendix D) and the planting was delayed until fall. On 11/23/87 through 12/2/87, 120 acres were contract planted with 35,874 containerized bitterbrush seedlings.

The weather during this time was mostly cloudy with intermittent rain, snow, and cold temperatures. The seedlings were stored on site in a horse trailer. The contract required a 36" square planting scalp for each seedling. The contractor was experienced; crew size averaged 17.

The seedlings, used in this project, were grown in containers at Native Plants Inc. in Utah and the University of Idaho in Moscow. Both nurseries failed to meet minimum specifications for seedling stature in the spring of 1987. By fall, specifications were met and the plants were shipped to Boise and stored under tarps in the Boise District wareyard. Some seedling mortality occurred at this time due to a delay in contract initiation. The seedlings were grown

in plastic sleeves in wire baskets which made storage and transport difficult and time consuming. Pack mules were used to carry plants into some of the planting units, otherwise, plants were carried in by hand. Additional mortality was observed after planting due to frost heaving. Many of the plants were literally pushed out of the planting holes and found lying on top of the ground.

Summary:

This was our first experience planting bitterbrush and sagebrush seedlings by contract. Containerized planting stock will not be used in the future due to difficulties with disposing of the plastic sleeves and wire baskets and the fact that we experienced some container mortality. This planting project experienced high mortality due to plant quality, frost heaving and weather. All subsequent plantings were scheduled and completed in the spring.

Spring 1988:

The last aerial seeding (1500 acres), designed to reduce erosion, was completed using a grass/forb/shrub mixture (Appendix B). Between 3/23/88 and 4/14/88, 72,420 bitterbrush and Hobbie Creek sagebrush seedlings were planted on 284 acres by contract.

Bare-root seedlings were jelly treated by BLM personnel with Aqua Gel (hygroscopic crystals that absorb water), rolled in burlap, packed in boxes and stored in cold storage. Contract inspectors transported seedlings daily in a covered vehicle to work sites. The weather was cold with rain and snow, some warming occurred towards the end of the contract. The contract required a 36" planting scalp for each seedling.

The contractor had no planting experience, made his own planting tools, and hired his crew from the local job service. Crew size was small, had a lack of experience and supervision. There was a constant turnover in crew members and planting quality was poor.

In other project work, approximately 12 miles of electric fence were constructed by contract to protect bitterbrush plantations from livestock depredation. Volunteers planted an additional 17,000 seedlings over 102 acres (3700 volunteer hours). The 16 previously established experimental plots were monitored to collect survivability data. A two year research project with University of Idaho was initiated (Jirik and Bunting, 1989). This completed all project work funded under the emergency fire rehabilitation plan.

Summary:

Having an inexperienced contractor greatly hindered this project. There are few procurement procedures to prevent the selection of contractors with little or no experience. The selection is made by low bid and experience is not required to be awarded a government contract. The only recourse is to work closely with an inexperienced contractor and guide their work toward acceptable completion.

Spring 1989:

The Squaw Butte/Willow Ridge Restoration Plan was written to demonstrate the need and acquire the funding to continue the rehab program (Mattise, 1989). This year the planting contract proceeded for 30 work days from 3/21/89 through 4/29/89. There was a shut down for 9 days at the start of the contract due to very wet conditions. Bitterbrush and Hobbie Creek sagebrush seedlings (72,420) were planted by contract on 249 acres. The contract required a 36" square planting scalp for each seedling.

In addition, approximately 63,000 seedlings (300 acres) were planted using government crews and a mechanical tree planter pulled by a four wheel drive, rubber tired tractor. Volunteers also planted 2,000 seedlings over 10 acres (900 volunteer hours).

The government stored the bare root stock seedlings at a USFS nursery cold storage; small quantities, (10,000 to 15,000) were delivered to the contractor periodically by field inspectors. The contractor then jelly treated

(hygroscopic crystals) seedling roots, rolled plants in burlap and stored them in a shed at his home. The contractor transported seedlings to the planting units in covered vehicle.

During this project, planting crews experienced moderate temperatures and rain mixed with sunny weather. The contractor had little planting experience and the crew was inexperienced and small. As in the previous contracts, the contract was bid by the acre. The contractor disagreed with contract figures for acreages and requested the planting units be resurveyed. The contractor had the crew scalp a planting unit completely, leaving the scalps exposed for a few days before they were planted. When the crew returned to plant a scalped unit, they often could not get the augers down an acceptable depth because of rocks beneath the surface soil. They would then move on to the next scalp (12 feet away) instead of trying a second hole. The contract required them to use hodads in rocky areas. The contractor was angry that time and money was spent scalping ground that couldn't be planted. The inspectors recommended that a crew member be sent ahead of the scalpers to check for rock. The contractor argued that it was the government's job to check for rock and disputed and won arguments over payment for rocky ground that was inside the flagged units vs. ground that was actually planted (we skipped over a lot of ground because of rock). The Contracting Officer came out to the work site several times to address disputes over contract language. The inspectors actually caught the contractor moving boundary markers in the planting units to reduce the size of the unit, thus reducing the acres and the amount of work to be done, but still getting credit for the full unit.

Summary:

There were problems with the contract language. The contractor had little planting experience but lots of contracting experience. Things that were assumed in earlier contracts were points of contention this contract. Unless tested, it is hard to anticipate the amount of rock beneath the surface, shallow soils, and the amount of unplatable ground in a planting unit. This prompted us to change future contract specifications completely by making the bid item by the plant, not by the acre. This allows more flexibility in

unplantable areas within designated planting units. A decision was also made to reduce our scalp size from 36" to 24" because of concerns that soils surrounding the newly planted seedlings were becoming to dry. It was also ascertained that immediate inspection (eg. looking at planting quality directly behind the contractor and immediately correcting any planting errors) gave the best planting quality and a better chance for seedling survival.

Spring 1990:

The 1990 planting contract was conducted from 3/14/90 through 3/28/90. Approximately 60,105 bitterbrush and Hobbie Creek sagebrush seedlings were planted on 275 acres. The contract required 24" planting scalps for each seedling.

Volunteers also planted 10,000 seedlings over 75 acres (2700 volunteer hours). Survivability data from the experimental plot project was collected and added to the data base.

Seedlings were stored at USFS nursery cold storage to assure freshness. BLM personnel took small quantities of plants (10,000), jelly treated the roots (hygroscopic crystals), rolled the plants in planting blankets and stored them in a non-temperature controlled shed. Small quantities (5,000) were then periodically delivered to contractor in a covered vehicle.

The temperatures during this project were moderate, with sunny weather and periodic moisture. An experienced contractor with a small crew was awarded the contract. Due to the experience of the contractor, contract administration took less time than previous years. Using hodads, the crew was more efficient at planting and more experienced at handling the seedlings. On this contract, experimentation with "rangeland micro siting", was initiated. This involved planting seedlings behind rocks, logs, sticks and large bunch grass plants for protection. It was hypothesized that the benefit of the shade provided to the new seedlings by the bunch grasses would outweigh the disadvantages of competition for available moisture. The scalp size was also reduced to 12" when "micro-siting" was used because it was observed

in earlier years that the surface soil (silt loam to very stony clay loam) dried out very quickly. It was also hypothesized that the amount of moisture saved by leaving the surface annuals covering the soil from drying would be greater than the moisture competition from the annuals themselves.

Summary:

Having an experienced contractor was an advantage over past years, yet the contracting procedure still required refinement. When "rangeland micro-siting" was used, it was observed that the adult bunch grass plants used for shade competed more efficiently for available moisture than the seedlings and caused stress and increased seedling mortality. A smaller scalp size used in conjunction with micro-siting, provides more soil moisture for the seedling, but also may cause increased competition with annuals.

A better system or facility for on site temporary seedling storage is needed. Some units are up to two miles from any access road, and must be carried in by the planters. The number of seedlings that can be taken to the planting site is limited to the number that can be planted in half of a work day. The contractor will be required to periodically transport "fresh" seedlings to the worksite.

Spring 1991:

From 3/13/91 to 3/18/91, 6 working days, we contract planted 60,000 bitterbrush and Hobbie Creek sagebrush seedlings (235 acres). The contract required 24" planting scalps. Seedlings were picked up from a USFS nursery and were jelly rolled (Tera Sorb hygroscopic crystals), by government personnel, bundled in planting blankets and stored in a covered shed. Large quantities, (12,000) were delivered to contractor daily. Contract inspectors transported seedlings in a covered vehicle.

The weather during planting was cold, the ground was slightly frozen, with 1-2 inches of snow on the ground. Planting conditions were excellent with some thawing and melting occurring during the final days. The contractor was

experienced and had a large crew, good supervision and primarily used hodads. Planting was started earlier than past years to take advantage of maximum ground moisture. This was accomplished because plants were lifted in the fall and stored in cold storage rather than waiting for a spring lift. The USFS nursery used to produce the seedlings is situated in a high mountain valley and planting conditions are often ready before ground thaw allows plants to be lifted in the spring. Planting seedlings early allows them to break dormancy in the ground and takes advantage of all available spring moisture. It was much harder working with large, non-English speaking crews. More inspectors are needed to cover the progress generated by larger crews.

Summary:

The third year of planting under the Squaw Butte/Willow Ridge Shrub Restoration Plan (Mattise 1989) was contracted through the Small Business Administration (SBA) 8A Contractors and not the normal competitive bid process. SBA 8A bids are negotiated locally using area small businesses of minority or disadvantaged contractors. The quality of work of the SBA contractor was good and this contracting procedure will be used in the future. By having the field inspectors prepare the plants for the contractor the amount of time which plants are transported and handled has been reduced. The use of larger experienced crews gets more plants in the ground quicker, but it is important to have an adequate number of field inspectors on site to continually check planting quality. If the number of inspectors is inadequate, a large crew can take advantage and planting quality will suffer. Getting in and out of a project in 5 days early in the season was good for survivability. If seedlings are lifted from the nursery in the fall and planted while the ground is slightly frozen, plants come out of dormancy naturally as the ground begins to thaw. This can reduce planting stress on the seedlings and improve survivability.

Spring 1992:

During this final planting year, we again utilized the SBA process and acquired the same contractor as the previous year. Approximately, 25,000

bitterbrush & Hobbie Creek sagebrush seedlings (142 acres) were planted. The contractor had a large crew, 24 people, and completed the contract in one working day. The contract required an 18" planting scalp. The scalp size was reduced because a greater percentage of native perennial grasses and smaller quantities of annual grasses were present.

The weather was warm with partly cloudy skies and the ground was moist from spring rains. Seedlings were lifted in the spring from the local USFS nursery. The nursery has discouraged fall liftings because of added stress to seedlings from possible mold growth in over-winter storage. Seedlings were jelly treated (Tera Sorb hygroscopic crystals), rolled in planting blankets by blm personnel and stored in a shed in the BLM wareyard. Plants were taken from cold storage, rolled, transported and planted in a short time reducing the stress on the seedlings.

Summary:

Due to a large planting crew and smaller scalps, we were able to plant all 25,000 plants in one day. An early ground thaw permitted the seedlings to be lifted early in the spring, and got the plants into the ground as soon as possible.

It was decided to return to a larger scalp size in future plantings. The smaller scalps were not adequately eliminating competition for available moisture. Even with good planting conditions and the best effort by the contractor, there was little available moisture left for the seedlings after the planting season.

Summer 1993:

The 16 experimental plots were monitored for survivability and the data analyzed in preparation for the final project report.

Squaw Butte Rehabilitation/Restoration Synopsis:

After the fire in 1986, before any shrub rehabilitation was initiated, 100 soil samples were collected from burned shrub sites. These samples were analyzed to determine if any bitterbrush or sagebrush seed survived the heat of the fire. Since no viable seed was found in any of the samples, this major shrub rehabilitation effort was launched. In 1992, after six years of project work, over 398,000 seedlings have been planted. Extensive coordination, cooperation and consultation was conducted with grazing permittees and other interested parties to provide information and receive input on planting projects.

Survivability of the plants was influenced by pressures beyond our control. The affect of some impacts on plants differed with various plantations. For instance, browsing and trampling by deer, elk and livestock did not seem to have a major impact on survivability in most plantations, but it was documented and noted in some. The most severe, uncontrollable impact on survivability appeared to be girdling and defoliation of the plants by insects and rodents. In some plantations, tunneling by pocket gophers also escalated the mortality of the seedlings.

A major factor that enhanced seedling mortality was the lack of normal precipitation in the area. Weather data was collected by the National Weather Bureau at a weather station in Emmett, Idaho. Data was analyzed from March through September, 1987 to 1992 (Table 1). During this period of time, five of six years were below normal with an average of -2.16 in. of normal per year. Precipitation levels for 1990 were above normal by .64 in.

Inconclusive monitoring was done on the contract plantations. The conclusions we have stated above have been derived from monitoring and survivability data of the 8 bitterbrush experimental plots. The experimental plots were initiated in the spring of 1987 from the same stock planted as the 1987 fall contract plantings. With very little data available about planting bitterbrush seedlings and our inexperience in contract planting, errors were

made in negotiations, planning, logistics and plant handling, but valuable lessons were learned.

Table 1.
Total precipitation and departures from normal
from the Emmett, Idaho weather station.

1987

November	1.01/-0.48
December	1.54/-0.08
Annual	8.60/-4.50

	1988	1989	1990	1991	1992
March	.93/-.14	3.19/2.12	1.08/.01	1.41/.34	.22/-.85
April	1.66/.53	.78/-.30	2.42/1.29	1.55/.42	.78/-.35
May	.38/-.85	.38/-.85	3.56/2.33	1.91/.68	.12/-1.11
June	.70/-.34	.14/-.90	.39/-.65	.57/-.47	1.89/.85
July	.12/-.03	.08/-.07	.23/.08	.02/-.13	.56/.41
August	.02/-.36	1.66/1.28	.97/.59	.02/-.36	.10/-.28
Sept	.51/-.28	.72/-.07	.02/-.77	.29/-.50	.24/-.57
Annual	11.66/ -1.44	12.11/-99	13.74/.64	11.74/ -1.36	10.57/ -2.53

In the spring of 1987, sixteen experimental plots were designed and established within the crucial winter range area. Eight bitterbrush plots with 20 plants each of six selections and eight sagebrush plots with 20 plants each of three selections. All six selections came from areas in both

sedimentary and basaltic soils located from Boise, ID. west to the Snake River. Two of the sagebrush selections came from Utah and the third from the Boise Foothills. Two plots were planted on each of the four aspects for each species. The purpose of the study was to derive whether any of the selections were more adapted to the area than the others and which aspect was most productive. Four of the bitterbrush plots were also fenced to establish if livestock browsing and trampling contributed to plant mortality. The overall survivability ratings of the plots provides an indication of the overall survivability of the contract bitterbrush plantations (Table 2). It also furnishes an insight to the aspect, at least in this area, which bitterbrush seedlings have the best chance of survival.

Table 2.
Survivability Based on Plot Aspect*

Aspect	Percent Survivability		
	1990	1990	1993
North	68	55	36
East	63	27	0.5
South	68	68	46
West	86	49	5

Mattise and Olson, 1994.

All plants used in the bitterbrush plots were containerized stock. Due to a difference in the hydrostatic pressure between the medium in which the plants were grown and the soils of the area, frost heaving was very prevalent and was a major cause of seedling mortality. Plants on the north and south slopes had a higher survival rate and significantly more growth than the east and west slopes. In summary, many variables impacted the survival of seedlings in the plots. Frost heaving had a major impact and together with annual grass

competition and summer drought, resulted in high seedling mortality. (Jirik and Bunting 1989)

Summary:

The following details should be considered when contract or agency shrub rehabilitation projects are being considered.

With only one year of experience using containerized seedlings, it is difficult to make a final conclusion about this technique. The soil medium of containerized stock may not be compatible with certain soils, particularly those of the Idaho Batholith, and this may cause additional mortality. The spongy plant medium tends to dry out faster than native soils. The roots also tend to remain in the potting medium and as this medium dries out, the seedlings die.

Efficient contract operations depend on experience of contract managers and project inspectors. It is most important to have the same team members work the entire contract to insure consistency during a contract.

The contracting officer can only enforce the content of the contract specifications, it is most important to have all specifications explained and documented. All specifications necessary to the project, no matter how trivial, should be written into the contract. Once they are in the contract, they can be enforced. Contract changes during the planting phase can be very expensive. Obtain examples of contracts from other agencies doing similar projects and modify them to fit your situation. In the contract, explain clearly WHAT YOU WANT, WHERE and the TIME FRAME.

Project costs will vary depending on agency goals, number of inspection personnel, availability of plant materials, logistics and the experience of those involved in the project. An overall view of the project costs can be found in Appendix C.

According to nursery personnel, the use of a cold storage facility is very important for the health of bareroot seedlings. Ideally, a trailer with

cooling capacity could be used to store seedlings at the worksite for the duration of the contract. Seedlings should be kept at the same temperature and environment of the nursery storage coolers. If the worksite is cold, even with snow on the ground, the seedlings could go from the cold storage trailer to the planting bags (possibly wet down and rolled in towels to protect from the wind and sun and their drying effects) and then planted. If the planting site soil is warming up, it would help to slowly acclimate the seedlings to the planting site soil temperature. The seedlings should be kept moist and protected from the wind and sun during this time. There should be a maximum of 24 hours from the time the seedlings leave cold storage, are moistened and brought up to soil temperature, to the period when they are planted. It is imperative to pay extra attention to worksite conditions and climatize your seedlings before the are planted.

Plants lifted from the nursery in the fall and held in cold storage over the winter are still respiring. This may cause mold to form on the seedlings root systems and cause additional stress. If the nursery ,however, will lift your seedlings in the fall and store them throughout the winter, seedlings will be available as soon as your planting site is ready. If you incorporate a spring lift, your planting site could be ready before the nursery is able to lift your planting stock.

Start your planting project as early in the spring as possible. This gives the seedlings the best chance to overcome the stress of planting with the higher precipitation rates of the spring season.

Start your planting as soon as the sites are accessible and the planting stock is available. Optimum planting conditions include two inches of snow on the ground, one inch maximum of frozen ground, and moisture in the upper 10 inches of soil. It is most desirable to have the seedlings break dormancy after planting and at the same time as the other vegetation on site.

We experimented with 'micro-siting planting' which is planting seedlings behind an object to give it added protection from the wind,sun and trampling. Micro-siting behind objects such as rocks and logs is an effective technique.

We found, however, that the benefits of protection to seedlings provided by bunchgrass plants does not out weigh the competition for moisture from the established root systems of these mature plants.

An average of 24 inch square scalps is needed to reduce competition for moisture from other adjacent vegetation. Do not allow the contractor to completely scalp and auger an area and return later for planting. This practice reduces the soil moisture in the augured planting hole and increases planting stress on seedlings. We found that the greater the density of annual grasses on your planting site, the larger the scalp you will need. If you are planting in higher elevations with lower densities of annuals you can reduce you scalp size according to the competition on site. A variety of scalps sizes were tried through the years, 18 inch, 24 inch to 36 inch and 12 inch during micro-siting. A 24" scalp gives enough protection from invading annuals to help the seedling past planting stress.

Various techniques were used to protect seedling roots from the effects of wind, sun and drying during storage and transportation. Different types of hygroscopic crystals (crystals that absorb and store water) were used to treat seedling root systems. Seedlings were first wrapped in burlap and then Kentex towels to retain moisture and stored upright in open containers. Seedlings were transported to the planting unit in covered vehicles. There is a possibility that the hygroscopic crystals used to protect seedling root systems may restrict the movement of soil moisture into these same systems. The amount of crystals used, however, is minimal and the competition is probably insignificant. A better medium to protect the seedlings during transportation and acclimation to the planting site has not been found. It is essential to reduce the time the plants are exposed to fluctuating temperatures, drying, sun, wind and other components. Seedling survivability will increase as exposure to elements and temperature fluctuations decrease. It is suggested that seedlings be treated with the hygroscopic crystals and kept in a temperature controlled environment.

We suggest working very closely with the planting contractor to insure the best quality product. We spot inspect the plantings directly with the

contractor. With this method, if mistakes are found, they can be corrected immediately. We also have an inspector running transacts behind us to calculate the quality of the planting. The contractor is paid for the quality of the work by the percentage of correctly planted seedlings. If 98% or more are planted correctly, full contract payment; 97% - 85%, the percentage of correctly planted seedlings; below 85%, the incorrectly planted seedlings must be replanted. By working directly with the contractor during the planting process and immediately correcting any planting errors, both the government and the contractor have a successful project.

An Optimum Planting Situation

1. Inquire with your Contract Specialist and the Small Business Administration in your area to find experienced planting crews within your state. Contact them regarding your project and their interest in submitting a contract bid. We have found this to be an advantage over the low bid contracting process.

2. Make sure your contract is well written. Get examples from other agencies that have experience with contract planting (Appendix A). Make sure that all specifications addressed in your contract are explained thoroughly. All details, no matter how trivial, involved in the project, should be stated in the initial contract before contract negotiations begin. If changes are made to the contract after the project is started, they are costly and disrupt already strained budgets. Acquire a list of planting contractors from other agencies and send out project announcements.

3. Store all seedlings in a cold storage trailer that can be moved to the planting site. Keep seedlings stored until planting begins unless acclimation to planting site soil temperature is necessary. If plants need to be acclimated, remove from storage at least 24 hours before planting, treat with hygroscopic crystals, wrap roots in planting towels and store in open containers, leaf side up.

4. Have enough qualified project inspectors to work with and inspect crew performance. Finding inspectors with experience may be difficult. Contact other agencies with planting experience. You can ask them to give a short training session on the inspection techniques they use for their planting contracts. You can then modify these techniques to fit your present situation.

5. Work closely and directly with the crew supervisors, not against them. You will have less trouble and ultimately better seedling survival if you establish a rapport with these people. You must be strict, but fair. Establish the ground rules for planting inspections and the consequences for unacceptable performance. Usually the contractors will test you and your system continually throughout the contract, so being familiar with the contract and being consistent with inspections is a necessity.

6. Coordinate closely with grazing permittees, recreationists and special interest groups to provide information and receive input on proposed planting projects.

7. It is necessary to plant early and have spring rains for your newly planted seedlings to survive. Good luck!

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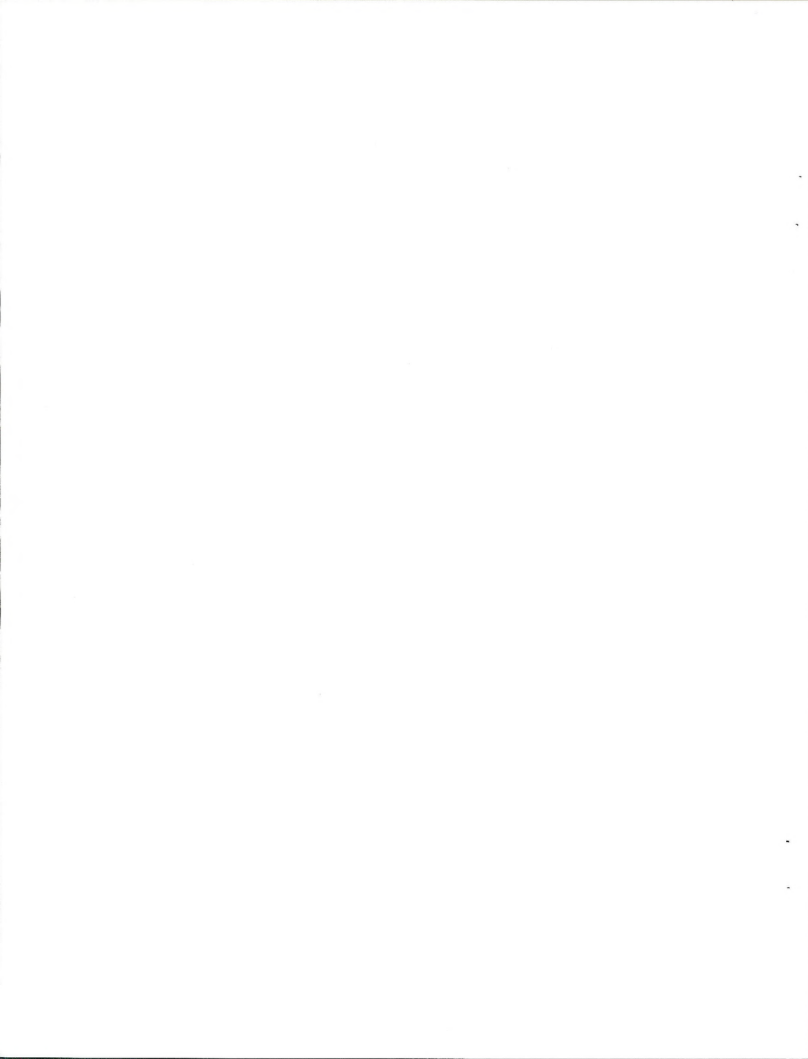
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APPENDIX

Appendix A - Planting Contract (Example)

Appendix B - Aerial Seeding Species List

Appendix C - Inspection personnel, plant materials and contract
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Appendix D - Minimum Plant Standards

Appendix A

Foothill Bitterbrush Planting Contract
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SECTION B
SUPPLIES OR SERVICES AND PRICE/COSTS

Contract No.

Foothill Bitterbrush '94

1. BASIS FOR AWARD: Quotes will be received on the following Schedule on an all or none basis; no quotes will be considered for only part of the Schedule. Award will be made to the responsible quoter submitting the lowest priced, responsive quote, based upon the unit prices quoted. Quoters are cautioned, therefore, to be sure that a unit price is shown for each item. Failure to show a unit price for each item may result in rejection of the quote as non-responsive.

2. PRICING SCHEDULE

Item			Unit		
<u>No.</u>	<u>Description</u>	<u>Quantity</u>	<u>Unit</u>	<u>Price</u>	<u>Amount</u>
1.	Planting bitterbrush seedlings	est. 50,000	seed-lings	\$ _____	
				\$ _____	

APPROXIMATE START DATE: March 1, 1994

PERFORMANCE TIME: Ten calendar days

WORK DATA SHEET

Estimated Acres: 200
Shrub Species: Bitterbrush
Shrub Age: 1-0 bare root stock
Type of Treatment: Initial planting
Spacing: 12' x 12'
Approx # Of Shrubs per Acre: 255
Inspection Plot Size: 1/50 th

The units are expected to be accessible to within 1 mile (horizontal miles measured on a map) of a road. The units are accessible by jeep trail in good weather. Four wheel drive vehicles are highly recommended.

The sites contain approx 1110 acres. The project consists of planting an estimated 50,000 bitterbrush seedlings. At an approximate 255 bitterbrush seedlings per acre, approximately 200 acres will be planted. The sites contain more acres than necessary because of differing ground conditions (eg. under ground rocky conditions) and differing weather conditions may be encountered. The seedlings will be planted in the best possible ground on the sites. This will require omitting rocky and other undesirable ground on the sites.

SECTION C
DESCRIPTION/SPECIFICATIONS

PART 1: GENERAL

1.01 The purpose of this contract is to secure services for planting Government furnished bitterbrush seedlings. The Contractor shall furnish all labor, tools, equipment, supervision, transportation, supplies, and incidentals to perform all work necessary to plant seedlings on the areas specified.

1.02 PERFORMANCE TIME

A. Performance time under this contract shall be ten calendar days.

1.03 GOVERNMENT FURNISHED PROPERTY

A. The Government will provide 50,000 bitterbrush seedlings of one-year-old bare root stock for planting. The Government will furnish the seedlings already dipped and bundled.

B. For the purposes of measurement and payment, the number of seedlings in each box as counted by Lucky Peak Nursery will be used. If the Contractor does not agree with the count, seedlings will be re-counted before they are planted by the Contractor or a designated representative with a Government representative present.

C. The Government-furnished property will be provided by the Bureau of Land Management at the most convenient roadside point nearest to each planting site located east of Boise, Idaho. This site shall be determined by the Project Inspector. The Contractor shall be responsible for care of the seedling stock and shall transport the seedlings from the roadside delivery point to the planting areas.

D. Bundle material used in wrapping seedlings shall be returned to the delivery point daily or as needed for bundling additional seedlings. Bundle material left in the planting areas and not returned will be considered wasted.

E. References made to tree seedlings apply also to shrub seedlings under this contract.

1.04 LOCATION

A. Project is located in the Bruneau Resource Area, Elmore County, Idaho.

1.05 BOUNDARIES

Boundaries of all planting sites are identified by the work location maps in Section J.

PART 2: PLANTING OPERATIONS

2.01 SEEDLING PREPARATION

A. See Section D, Packaging and Marking.

2.02 SITE PREPARATION

A. Hand scalping - The work shall involve clearing by hand tools (provided by Contractor) all debris and vegetation including surface roots down to mineral soil. Scalping shall be performed before seedlings are planted. Each scalp will be a minimum of 18 inches in diameter.

2.03 PLANTING METHODS

- A. Seedlings will be planted in accordance with the STANDARD method.
- B. Standard Planting - Proper selection of planting site is important, and clearing efforts will be required to prepare the site for planting and maintaining required spacing. Examples of plantable and unplantable areas in this method will be indicated by the Project Inspector on the project site.
- C. Spacing - Seedlings shall be planted in spots distributed over the area at approximately 12 foot spacing (slope distance not horizontal distance) provided that, for individual seedlings, the specified average spacing may vary as much as 25 percent (three feet) in any direction to find a suitable planting spot. This spacing will approximate 255 plants/acre.
- D. Where an Unplantable Spot is Encountered - The planter shall move over the unplantable spot and resume the required spacing when the ground becomes plantable again.
- E. No seedling shall be planted closer than eight feet from other existing seedlings. "Other seedlings" include natural, previously planted, or newly planted seedlings readily seen by the planter.
- F. Planting Site Selection - Wherever possible, planting spots shall be where stumps, logs, dead brush, and terrain features provide partial protection from sun, wind, animals, loose debris, and other agents detrimental to seedling survival and growth. Planters will be required to plant all areas, unless they meet one or more of the conditions defined below as unplantable.
- G. Unplantable - an unplantable area (spot) will be characterized by one or more of the following conditions:
- a. Rock outcrops, talus slopes, and areas of stone, cobbles or gravel over 12" deep.

- b. Sites with obvious rodent activity.
 - c. Sites with obvious runoff, i.e bottoms of drainages.
 - d. Animal & human travel paths - planting sites shall be a minimum of five feet, each side, from travel paths.
 - e. Examples of unplantable and plantable areas will be indicated by the Project Inspector prior to planting on the project site. Project Inspector will make the determination whether a site is plantable or unplantable.
- H. Clearing of Planting Spot (Hand Scalping) - The planting spot may be exposed mineral soil or covered with vegetation, gravel or slash, which will require a clearing effort before planting. Clearing shall include the removal of all debris, gravel, humus, ash, dead vegetation material and living vegetation (including surface roots) a minimum of two inches deep. Cleared areas shall be no smaller than 18 inches in diameter. There shall be a minimum of nine inches of cleared space surrounding planted seedling, i.e. the seedling shall be planted near the center of the 18-inch cleared area. Wherever possible or practical, locate spots on the north and east sides of stumps, logs, and rocks.
- I. Preparing the Planting Hole - Planting holes shall be located near the center of the prepared area and shall be oriented at an angle between perpendicular to the slope and true vertical (see illustrations 1 through 5, Section J). Planting spots may be cleared (scalped) a maximum of 24 hours prior to plant hole preparation. Planting hole must be two inches deeper than the maximum root length of the bitterbrush seedlings. Plant hole shall be prepared (dug) a maximum of one hour prior to planting the seedling.

2.04 SEEDLING CARE

- A. Seedlings shall be protected at all times from drying, heating, smothering, freezing, crushing, drowning, abrasion, rapid temperature fluctuations or contact with injurious substances.
- B. Seedlings stored in boxes, bags, or bundles shall not be exposed to direct sunlight. Containers of seedlings shall be opened only in full shade. Bundles, bags, or boxes shall be loosened to provide free air movement. See Section C, Part 3, Distribution and Care of Seedlings.
- C. Seedlings shall be planted without further root or top pruning or culling. If pruning or culling appear necessary, or if mold, dry roots, or evidence of injury is seen, the condition shall immediately be reported to the Project Inspector.

2.05 FIELD HANDLING

- A. Seedlings in planting bags shall have only their tops exposed. Wrapped seedlings shall have the wrapping loosened slightly to allow individual seedling removal. Seedling bundles must not come apart in the planters bag. Seedlings must be transported as they arrive at the site. Seedling bundles may not be grouped together into larger bundles.
- B. Seedlings shall not be removed from planting bag until immediately before planting in a prepared hole.
- C. Seedlings shall be gently removed, one at a time, to prevent stripping or other injury, and quickly and gently inserted into the planting hole. Removal by the terminal bud is not permitted.
- D. Seedlings carried in planting bags shall not exceed the amount that can be removed without injury, or which can be planted before critical heating or drying occur. This will be determined by the Project Inspector. Seedlings placed in bags shall be planted out and not returned to storage. Seedlings may not be transported around the site in bundle wrapping only. A planting bag or other approved storage device shall be used.

E. Seedlings shall not be stored partially up a slope in a planting unit unless there is adequate protection from the environment. See Section C, 2.04 Seedling Care. Project Inspector shall make the determination whether a site is acceptable or not.

2.06 SEEDLING PLACEMENT

A. Seedling Planting - The seedling shall be suspended near the center of the hole with roots extending down in a near natural arrangement at a depth that, after filling, packing, and leveling, the root collar is even with or slightly below the firmed soil level. No portion of the roots shall be exposed. If an auger is used, seedlings shall be planted in the center of the augered hole; no side hole planting will be allowed.

B. Filling and Firming - Moist mineral soil shall be filled in and firmed around seedling roots. Dry soil, ash, organic matter, rocks, and other foreign matter shall be kept out of holes. Soil shall be filled in and firmed progressively (layered) so no loose soil or air pockets remain and the seedling is as firmly planted as soil conditions will allow. Filling planting holes and firming is done in three phases; filling the hole 1/3 to 1/2 full and compacting; filling the hole 2/3 full and compacting; and completion of filling and compacting. Compacting shall be done by hand. Using sticks, hand tools or a boot heel will not be allowed for compacting soil. The Contractor shall not wedge the sides of the hole, and firming the soil around the seedling shall be done in a manner that assures the seedling and root systems are not damaged. Filled planting holes shall not be stomped with the foot. After the soil is firmed around the seedling it shall be smoothed out to the level of the surrounding mineral soil surface. After planting, the seedling stem shall be erect and free to grow. The seedling shall not be wedged down with mud or debris. Soil or other debris shall not be left covering the leaves or stems of the planted seedling.

C. Auxiliary Hole - An auxiliary hole is a hole dug on the edge of the 18-inch diameter cleared areas to obtain additional soil to assist in the refilling and firming of soil around the seedling or an attempted hole that did not

meet the minimum depth required for seedling planting. These may be dug but shall be refilled with soil or debris.

- D. Correct and incorrect planting methods of seedlings are shown in Section J of these specifications. Despite a reference to trees, the same methods apply to shrub seedlings.

PART 3 DISTRIBUTION AND CARE OF SEEDLINGS

3.01 DELIVERY

- A. Seedlings will be issued to the Contractor at the roadside nearest to the planting site, unless other arrangements are approved in writing by the COR. Seedlings will be issued at a designated time of each work day. Seedlings will be issued on a daily basis in quantities that the Contractor can plant in one day. The Contractor must request the number of seedlings on the previous work day. Seedlings must be protected against damage to tops and roots, including damage from freezing, heating, and drying per the following requirements.

3.02 TRANSPORTING

- A. Transporting of seedlings from roadside issue point to field (project) locations shall be in fully enclosed trailers or pickups with canopies. Seedlings may be transported in open pickups if fully covered with space blankets. Seedlings shall not be transported in heated vehicles. Transporting of seedlings around the project site with ATV's (or other similar vehicles) must be pre-approved by the Project Inspector. Proposed transporting methods must be approved by the Project Inspector prior to transporting the seedlings.
- B. Upon arrival at the planting site, seedlings shall be stored in a manner that protects them from direct sunlight, frost, and wind and provides for proper air circulation around bundles or boxes. The Contractor shall

provide a space blanket covering for proper protection. Seedlings shall not be allowed to stand or lay in water or snow or to be covered with snow. The Project Inspector must approve the location and method of storage of seedlings at the planting site prior to storing the seedlings there. Seedlings that are frozen shall not be handled until completely thawed. They shall be thawed in full shade. There will be no overnight storage of seedlings at the project site.

- C. Unless otherwise specified, planting bags shall be a light color and porous material, shall not retain water or heat, shall have a minimum depth of 15 inches, and shall be free of defects. Bags may have a shield of waterproof material attached to one exterior side to protect the planters from water seepage. During the planting operation, seedlings shall be transported around the project site in these planting bags. (See Section C, Part 7, Tools and Equipment) Planters shall be restricted to the removal of one seedling at a time from the rolled bundle and only after the planting hole has been prepared.
- D. The Contractor shall not do root pruning, top pruning, or culling except with the written approval of the COR. If seedlings are being pruned or culled without written approval from the COR, they will be considered wasted seedlings and will be charged to the contractor.
- E. If the Contractor notices dryness of roots, mold or other evidence of damage to seedlings, he will immediately notify the Project Inspector.
- F. Unless otherwise authorized by the Project Inspector, seedlings will be issued on a daily basis.
- G. Upon termination prior to completion, any unused seedlings will be returned to storage points or roadside issue points as directed by the Project Inspector. Upon completion of the project all seedlings should be planted out on the project site.

H. If inclement weather conditions occur during the planting operation which will damage seedlings (such as freezing or high temperature, drying winds, low humidity, or snow which prohibits the planting operation from continuing) any unused seedlings shall be returned to a storage site or roadside issue point as directed by the Project Inspector. The following environmental conditions must exist on the site before the Contractor will be allowed to plant:

Temperature:	Between 32° to 65° F.
Humidity:	Greater than 20%
Wind:	Velocity less than 20 mph.
Soil:	Not frozen more than 1 inch deep; upper 10 inches of soil is moist.
Snow:	Less than two inches.

PART 4: DEFINITIONS

- 4.01 Bare Root Seedling - A seedling grown from one to three years in a natural environment.
- 4.02 Culling - To remove by any method, any portion of the seedling roots or branches.
- 4.03 Pruning - The cutting of seedling top, roots, or branches with pruning clippers.
- 4.04 Space Blanket - Provides seedling protection from direct sunlight, frost, wind, and provides proper air circulation around bundles or boxes of seedlings.

PART 5: PLANTING STOCK

- 5.01 One year old bare root bitterbrush seedlings are to be planted under this contract. One year old bitterbrush seedlings will have root lengths of up to 16 inches. Planting stock will be provided by the

Government. In the event circumstances require substitution of age class or species, a modification of the contract will be negotiated with the Contractor to provide for any adjustment in cost due to the substitutions.

PART 6: CREW REQUIREMENTS

- 6.01 The Contractor must maintain an adequate work force at all times to insure timely completion of the work. At the prework conference, the Contractor shall provide a work schedule including the planned work force, which must be acceptable to the Government.
- 6.02 A non-planting, English-speaking supervisor shall be provided for each crew and is required to stay with the crew while planting is in progress. No more than twelve planters are to be supervised by one non-planting supervisor. Crew members shall not be scattered within or between units except as necessitated by on-the-ground conditions and only when authorized by the Project Inspector. Planters must stay within 200 feet of the non-planting supervisor. The supervisor must work closely enough with the crew to inspect and accept or pass the work done by the crew to insure contract compliance. The supervisor must correct any errors found in the planting process at this time and continually insure that the planting is done according to contract specifications. The Project Inspectors will run inspection test plots to insure contract compliance and to provide the basis for computing the rate of payment and will not supervise the planting crew.
- 6.03 The Contractor is responsible for the crew(s) knowing the requirements of the contract including, but not limited to, seedling care, proper planting, spacing requirements, unit location and scalping techniques. The Contractor or the supervisors shall also assure that debris from

crew's lunches and other breaks is thoroughly cleaned up. (The Project Inspector will not act as a supervisor to the crew.)

- 6.04 A wage interview by the Project Inspector will be given to selected crew members during working hours. These interviews will not exceed five minutes each in length.

PART 7: TOOLS AND EQUIPMENT

7.01 Unless otherwise specified, planting tools, materials, and containers for carrying seedlings (see Section C, 3.02, paragraph C.) during planting operations will be of design normally used in seedling or tree planting work. Only tools capable of opening a hole perpendicular to the ground surface, broken on three sides, and at least eighteen (18) inches deep and four (4) inches wide will be approved for use, unless otherwise authorized by the COR.

7.02 Tools used in scalping may be McCleods, fire rakes, hazel hoes or hodads. Planting bars, hodads or shovels may be used for planting in rocky areas. Augers may be used in areas with good soil. If an auger encounters a rocky area, the area shall not be passed over. An alternative planting method shall be tried. All containers, planting tools and other tools proposed for use by the Contractor must be approved by the COR and the Project Inspector at the pre-work conference.

SECTION D
PACKAGING AND MARKING

1. The Government will dip and wrap the bare root seedlings prior to planting. The contractor will be required to keep the seedlings moist and protected from the elements as described in Section C, 3.02, paragraph B.
2. The contractor will be required to return all bundle material used in rolling the seedlings to the Project Inspector at the road site closest to the planting site at the end of each work day or periodically upon request.

SECTION E
INSPECTION AND ACCEPTANCE

PART 1: 52.252-02 CLAUSES INCORPORATED BY REFERENCE (APR 1984)

1. NOTICE: The following provisions and/or contract clauses pertinent to this section are hereby incorporated by reference:

52.246-04 Inspection of Services--Fixed-Price (Feb 1992)

PART 2: INSPECTION

- A. The Government will inspect planting to determine compliance with specifications and to provide the basis for computing the rate of payment. Inspections will consist of observations of seedling storage and handling, site preparation, planting procedures, and examination of individual seedlings on sample plots. The sample plots will be taken throughout the payment item to obtain a representative sample of the work. Every 10,000 plants will be inspected separately. Inspection results on each 10,000 plants will not be averaged with those of the other plants.
- B. Determination of the acceptability of the work performed will be based on these inspections, which will be considered conclusive, except as otherwise provided in the contract. The Contractor or designated representative is encouraged to observe inspections while they are underway.
- C. Seedlings that are handled in a manner inconsistent with these specifications will be declared "wasted" seedlings, and may result in assessment of actual damages against the Contractor.

PART 3: PLANTING QUALITY

A. Planting procedures will be observed and planted seedlings on representative sample plots will be examined to assure and measure compliance with specifications. Specific items include:

a. Above Ground Inspection

- 1) Spacing
- 2) Planting Spot Selection
- 3) Site Preparation
- 4) Planting Depth and Exposed Roots
- 5) Stem Position or Damage
- 6) Firmness
- 7) Auxiliary Hole Left Open

b. Below Ground Inspection

- 1) Planting Hole Orientation
- 2) Root Configuration and Orientation
- 3) Altered Root Length and Damage
- 4) "Foreign" Material in Planting Hole
- 5) Loose Soil or Air Pockets.

PART 4: PLOT PROCEDURE

A. Sample plots will be examined as follows: The Inspector will mark on the ground a series of 1/50 (16.65 ft. plot radius) acre plots, as specified in Form 5700-5, sufficient in number to yield at least a one percent sample of the contract acreage. Plots will be uniformly distributed over each planting area. Inspection within each planting area will be done as follows.

B. Locate and mark the plot center on the ground.

C. Determine from Table 1 the average number of planting spots for the plot based on the specified average spacing. From this number subtract the number of acceptable existing seedlings and the number of unplantable spots. Record the difference as the number of plantable spots on which seedlings should be planted.

TABLE 1

<u>AVERAGE SPACING</u>	<u>AVERAGE PLANTING SPOTS ON 1/50 ACRE PLOTS</u>
12 x 12	6

D. Determine and record the maximum number of allowable seedlings from Table 2.

TABLE 2

Table 2. Determination of the Maximum Allowable Seedlings from Number of Plantable Spots Recorded in Table No. 1 above.

<u>PLANTABLE SPOTS</u>	<u>MAXIMUM SEEDLINGS</u>
1	1
2	2
3	4
4	5
5	6
6	7
7	8
8	10

E. Record the number of seedlings planted on the plot.

F. Determine and record the number of wasted seedlings on the plot. This will be the number of seedlings determined by subtracting the maximum number of

allowable seedlings (step C) from the number of planted seedlings recorded in step D, but not less than zero.

- G. Inspect and record the number of planted seedlings meeting the above-ground contract specifications. The maximum number of satisfactory seedlings to be credited shall not exceed that shown in Table 2.
- H. Determine and dig the minimum number of seedlings from those determined satisfactory above-ground as shown in Table 3.

TABLE 3

NUMBER OF SATISFACTORY (ABOVE-GROUND) <u>PLANTED SEEDLINGS ON PLOT</u>	MINIMUM NO. TO BE DUG <u>1/50TH ACRE PLOT</u>
1	1
2 - 6	2
7 - 9	3

The seedlings will be dug starting with the satisfactory seedlings closest to the plot center and progressing outward.

- I. Record the number of seedlings meeting below-ground contract specifications.

- J. Compute the planting quality by the following formula:

$$\frac{\text{No. of satisfactory seedlings above-ground}}{\text{No. of plantable spots}} \times \frac{\text{No. of satisfactory dug seedlings}}{\text{No. of dug seedlings}} \times 100$$

- K. Percentage of planting quality as calculated above will be rounded up to the nearest whole percent. Upon completion of each subitem (10,000 plants), the Contractor may request, in writing, a final evaluation of

planting on that subitem. The evaluation results for the subitem will be made available within three days of receipt of the Contractor's request.

- L. Average planting spots and maximum number of satisfactory seedlings shown in Tables 1 and 2 have been rounded to the nearest whole number and it is mutually understood and agreed that these figures will be used for determining planting quality even though they are not precisely correct from a mathematical standpoint.

PART 5: REINSPECTION UPON CONTRACTOR'S REQUEST

- A. If the original inspection results are unacceptable to the Contractor, a reinspection may be requested. Requests for reinspection must be made in writing within five days after receipt of notice of initial inspection results. The same inspection procedure will be used but new plots will be selected. The inspection pattern will be shifted so new inspection plots will not overlap previously inspected plots.
- B. Inspection Results Used to Determine Payment. The inspection results of the first examination will be used in determining payment and acceptability if reinspection results are within 5% of the first inspection. If reinspection indicates a variance of more than 5% from the first inspection, the results of the second inspection rounded up to the nearest whole percent will be used.
- C. Payment for Reinspection by Contractor. If the results of the reinspection rounded to the nearest whole percent are within 5 percentage points of the first inspection, the Contractor shall pay the actual costs of the reinspection based on wages and vehicle mileages of the reinspection crew.
- D. Using Form 5700-5 the following standards will be used to determine final payment for a planting unit:

- E. When the plant penalty factor (Step 8 of Form 5700-5) is 2% or less, 100% payment will be made.
- F. When the plant penalty factor (Step 8 of Form 5700-5) is greater than 2% and less than or equal to 15%, payment will be made for the actual planting quality percent earned.
- G. When the plant penalty factor (Step 8 of Form 5700-5) is greater than 15%, deficient areas shall be replanted if additional seedlings are available.
- H. When the plant penalty factor (Step 8 of Form 5700-5) is 15% or less after replant, payment will be made for the actual planting quality percent earned less the cost of the additional seedlings for the replant.
- I. When the plant penalty factor (Step 8 of Form 5700-5) is greater than 15% and no additional planting stock is available for replant, payment will be made for the actual planting quality percent earned.
- J. When the plant penalty factor (Step 8 of Form 5700-5) is greater than 15% after replant, payment will be made for actual planting quality percent earned.

EXAMPLE:

PER SEEDLING BASIS

Step 1 - 10,000 seedlings planted

$$10,000 \times .40/\text{seedling bid price} = \$4,000$$

Step 2 - $\$4,000 \times .14\%$ (payment adjustment factor) = \$560

Step 3 - $\$4,000 - 560 = \$3,440$ (amount to be paid)

SECTION F
DELIVERIES OR PERFORMANCE

PART 1: DELIVERY

FAR 52.212-03, COMMENCEMENT, PROSECUTION, AND COMPLETION OF WORK (APR 1984)

The Contractor shall be required to (a) commence work under this contract within five calendar days after the date the Contractor receives the notice to proceed, (b) prosecute the work diligently, and (c) complete the entire work ready for use not later than ten calendar days after receipt of notice to proceed. The time stated for completion shall include final cleanup of the premises.

Approximate Performance Period: March 1, 1994 - March 10, 1994

PART 2: PERIOD OF PERFORMANCE

The Government will issue a Notice to Proceed as soon as weather and ground conditions are favorable for survival of planting stock. The amount of contract time will start on the date specified on the Notice to Proceed if hand delivered, or on the fifth day after the post office has issued a notice of certified mail to the Contractor, or when planting commences, whichever is sooner. Failure of the Contractor to pick up certified mail will not be considered an excusable delay. The Contractor shall continue performance of the work under the contract without delay or interruption except by causes beyond his control as defined in the Contract Clauses of the contract, or by the receipt of a "Suspend Work Order" issued by the Government. Failure to do so will be considered a breach of contract. The Contractor shall complete all work within ten calendar days from the date of receipt of the Notice to Proceed.

Prior to issuance of the Notice to Proceed and starting work, the Contracting Officer or COR will contact the Contractor and mutually agree on a prework

conference date and location to discuss contract terms and work performance requirements.

The Notice to Proceed will be issued as soon as the COR can ascertain that foreseeable continuous performance can be maintained. However, weather conditions may preclude continuous production.

Whenever the COR determines conditions are unsuitable for seedling survival, the COR will issue a "Suspend Work Order" and the count of contract time will stop. [When conditions are again suitable, the COR will issue a "Resume Work Order"]. The count of contract time will resume on the day indicated by the Resume Work Order. It is the Contractor's responsibility to keep the Contracting Officer currently advised as to where the Contractor or the Contractor's Representative may be reached by phone during periods of work suspension (see Section C, Part 3, paragraph H. for examples of suitable conditions). If the Contractor cannot be reached the count of contract time will resume on the day indicated by the Resume Work Order.

At the prework conference, the Contractor shall provide to the COR a written "work progress plan" that details his work force and schedule to provide for orderly completion of the work within the contract performance time. This work schedule must be acceptable by the Government. As a minimum, the schedule should reflect a progress rate of work to be completed equal to the expired amount of contract performance time. The unit sequence work schedule will be determined by the COR at the prework conference and may be subject to some change because of normal variations in weather conditions at no change in contract time or price.

Work shall progress in accordance with the established schedule. An average production rate of (X) seedlings planted per calendar day as follows will be required. The average production rate (X) shall equal the number of seedlings divided by the total performance time for that item. The production rate will be based on a three or four day average.

SECTION F
DELIVERIES AND PERFORMANCE
(continued)

If the Contractor's progress falls behind 20 percent of the established work schedule, the Contractor's right to proceed may be terminated for default if satisfactory progress is not attained within 10 working days after receipt by the Contractor of a written notice of deficient performance. The Government will have a Project Inspector on the planting site to monitor the Contractor's progress and skill.

The Government may, by written notice to the Contractor, terminate the Contractor's right to proceed and declare the Contractor in default for improper disposal of Government furnished shrub seedlings. Improper disposal includes, but is not limited to, the wrongful ditching of or burying of seedlings.

SECTION G
CONTRACT ADMINISTRATION DATA

1 CONTRACTING OFFICER'S REPRESENTATIVE (COR)

After award, a Bureau of Land Management employee will be designated as the Contracting Officer's Representative for the purpose of administering the technical aspects of this procurement. The COR is authorized to clarify technical requirements and to review and approve work which is clearly within the scope of work. The COR is NOT authorized to issue changes pursuant to the changes clause or to modify the scope of work in any other way. If this contract contains a technical direction clause, the COR is designated as the official authorized to issue that technical direction.

2. PROJECT INSPECTOR (PI)

After award, a Bureau of Land Management employee may be designated as the Project Inspector. If so designated, the PI will provide onsite inspection of the work. Such PI will also be responsible for giving the contractor any special instructions for guidance necessary to complete the work in an orderly manner. The PI shall NOT be authorized to issue changes pursuant to the changes clause or in any other way modify the scope of work.

SECTION H
SPECIAL CONTRACT REQUIREMENTS

1. PRE-WORK CONFERENCE

After award, a pre-work conference shall be held between the Contractor and the COR. The date and time of the meeting shall be determined by the COR and the Contractor in consultation. Discussions relative to contract requirements and the specific responsibilities of each party will be conducted at this time.

2. NOTICE TO PROCEED

After award of contract, the COR will issue to the Contractor a written notice to proceed. Issuance of such notice may be delayed for a reasonable time if adverse soil, vegetative, or climatological conditions exist.

3. WORK HOURS

Work hours under this contract shall be limited to the time between one-half hour before sunrise to one-half hour after sunset each day. No work will be done on Sunday, unless mutually agreeable between the COR and the Contractor and authorized by the COR.

5. PRESERVATION OF HISTORICAL AND ARCHAEOLOGICAL DATA

a. Public Law 93-291, May 24, 1974, provides for the preservation of scientific, prehistorical, and archaeological data (including relics and specimens) which might otherwise be lost due to alteration of the terrain as a result of any Federal project.

b. The Contractor agrees that should the Contractor or any of his employees in the performance of this contract discover evidence of possible scientific, prehistorical, historical, or archaeological data, the Contractor

will notify the Contracting Officer immediately in writing giving the location and nature of the findings.

c. Where appropriate by reason of a discovery, the Contracting Officer may order delays in the time of performance and/or changes in the work. If such delays and/or changes are ordered, the time of performance and contract price shall be adjusted in accordance with applicable clauses of this contract.

d. The Contractor agrees to insert this requirement in all subcontracts which involve the performance of work on the terrain of the site.

6. PROSECUTION OF THE WORK

The capacity of the Contractor's plan, method of operation, and forces employed shall, at all times during the continuance of the contract, be subject to the approval of the Contracting Officer and shall be such as to assure the completion of the work within the specified period of time. To the extent stated in the specifications, the Contracting officer shall have the right to select the sequence in which the individual projects will be completed.

7. INSPECTIONS

a. Work will be subject to periodic inspections by the Government to assure satisfactory progress, to determine quantities of work performed for progress payment purposes, to be certain that work is being performed in accordance with contract specifications, and to determine if work corrections are necessary.

b. The Contractor shall notify the COR or the Project Inspector at least 3 days before the schedule completion date, so the Government can schedule final inspection. The contractor will not be granted a time extension to perform a work correction required as a result of a periodic or final inspection if such correction is necessary because of improper work by the Contractor. The Contractor or his authorized representative must be at the worksite at time of final inspection.

8. CHARGES FOR ACTUAL DAMAGES - DELAYED PERFORMANCE

Should the Contractor fail to complete the work within the performance time allowed or any extension thereof, and his right to proceed is not terminated, he shall, in the absence of a liquidated damages provision, be charged actual damages suffered by the Government which can be directly attributable to the Contractor's delayed performance. Such damage shall include but not necessarily be limited to the Project Inspector's hourly salary, per-diem, travel, or other expenses as well as losses of Government furnished property which can be accurately determined. This clause supplements FAR 52.249-08 Default (Fixed-Price Supply & Services) (Apr 1984).

SECTION J
LIST OF ATTACHMENTS

1. Form 5700-5, Planting Inspection Summary and Analysis, 2 pages
2. Illustrations 1, 2, & 3, Tree Root Placement & Planting, 3 pages
3. Work Location Maps, 4 pages

Appendix B

Plant species used for seed mixtures on aerially seeding projects.

A. Basaltic and granitic soils.

Species	Lbs./Acre
Intermediate wheatgrass	4
Whitmar bluebunch wheatgrass	3
Secar bluebunch wheatgrass	3
Pubescent wheatgrass	3
Bulbous bluegrass	1
Canby bluegrass	2
Sherman bluegrass	2
Latar orchardgrass	3
Lewis flax	1
Yellow sweetclover	2
Spredor II alfalfa	2
White rabbitbrush	1/4
Mountain big sagebrush	1/10 PLS

B. Sedimentary soils.

Ephraim crested wheatgrass	5
Siberian crested wheatgrass	5
Delar small burnett	2
Great basin wildrye	2
Ladak alfalfa	2
Four-wing saltbush	2
White rabbitbrush	1/4
Wyoming big sagebrush	1/10 PLS

Appendix C

Inspection personnel, plant materials and contract preparation costs.

1987	# people	hours	vehicle	# days
		<u>/day</u>	<u>/day</u>	
	4	10	60	8
				total \$ 3,968

<u># plants</u>	<u>cost/thousand</u>	
35,874	\$ 150 (graded)	total \$ 5,381

Contract costs total \$17,550

Total 1987 costs \$26,899

1988	# people	hours	vehicle	# days
		<u>/day</u>	<u>/day</u>	
	2	12	60	22
				total \$ 7,075

<u>#plants</u>	<u>cost/thousand</u>	
72,420	\$ 150 (graded)	total \$10,863

Contract costs total \$19,664

Total 1988 costs \$37,602

1989	# people	hours	vehicle	# days
		<u>/day</u>	<u>/day</u>	
	3	10	60	21
				total \$ 8,127

<u>#plants</u>	<u>cost/thousand</u>	
57,500	\$ 150 (graded)	total \$ 8,625

Contract costs total \$23,537

Total 1989 costs \$40,289

1990	# people	hours	vehicle	# days	
		/day	/day		
	3	10	60	17	total \$ 6,579

<u>#plants</u>	<u>cost/thousand</u>	
60,105	\$ 150 (graded)	total \$ 9,015

Contract costs total \$21,637

Total 1990 costs \$37,231

1991	# people	hours	vehicle	# days	
		<u>/day</u>	<u>/day</u>		
	4	10	60	10	total \$ 4,960

<u>#plants</u>	<u>cost/thousand</u>	
60,000	\$ 150 (graded)	total \$ 9,000

Contract costs total \$19,980

Total 1991 costs \$33,940

1992	# people	hours	vehicle	# days	
		<u>/day</u>	<u>/day</u>		
	5	14	60	2	total \$ 1,526

<u>#plants</u>	<u>cost/thousand</u>	
25,000	\$ 150 (graded)	total \$ 3,750

Contract costs total \$ 9,485

Total 1992 costs \$14,761

Note:

Wages are figured on a 1993 GS-7-1 rate (\$10.90/hour). Branch of Administration processing cost and Resource area implementation costs are not included. Contract preparation, planning and project layout costs were also left out because these can vary from agency to agency. Please adjust your figures accordingly. Contract inspection costs can vary with the experience of the contractor.

Appendix D

1. Growing contract reflecting "Minimum Plant Standards".
2. An example of a "nursery report" for bitterbrush seedlings.

SECTION C
DESCRIPTION/SPECIFICATIONS/WORK STATEMENT

1. INTRODUCTION

The purpose and intent of this contract is to secure the production and packing of one year old (1-0) greenhouse grown, containerized Bitterbrush seedlings.

2. GOVERNMENT-FURNISHED PROPERTY AND SERVICES

The Government shall:

- (a) Provide and deliver Bitterbrush seed in the amounts mutually determined as needed to produce the required number of seedlings in each bid item awarded. The Bitterbrush seed will be delivered by October 27, 1986, or other date agreed upon at the prework conference to the Contractor's nursery site or by mutual agreement to a seed dealer designated by the Contractor.
- (b) The seed shall be stratified by the Government.
- (c) Provide to the contractor the following information on all seed lots by October 27, 1986: species, seed test date, germination percent, number of seed per pound, purity percent, seed zone, elevation and testing lab, when available.
- (d) Provide to the Contractor a tentative removal schedule (dates, seed lots, and number of seedlings) by January 1 of the planned year of delivery for seedlings scheduled for fall planting period.
- (e) The containers and trays will remain the property of the contractor. Any trays or containers which are unusable or not returned will be paid for by the Government at 50% of purchase price, verified by a copy of the Contractor's invoice from his supplier. The Government will return all re-usable containers and trays to the contractor.

3. CONTRACTOR-FURNISHED PROPERTY AND SERVICES

The Contractor shall:

- (a) Provide all necessary tools, equipment, labor, materials except as noted in 2a., and perform accepted horticultural practices currently in use in the Bitterbrush greenhouse seedling industry necessary to promote growth of the seedlings, including watering and fertilizing the seedlings, protecting the seedlings from pathogens, insects and animals.

SECTION C
DESCRIPTION/SPECIFICATIONS/WORK STATEMENT
(continued)

- (b) Provide greenhouse space capable of maintaining an environment of temperatures and lighting that meet the minimum plant requirements in the contract.

CAUTION - There is little time to complete this contract. Quoters must be sure they have adequate heating, lighting, and other facilities to perform within the limited time frame. For example, The container seedling growth cycle requires the use of intermittent light during the night to extend the photoperiod.

- (c) Provide care for seedlings in accordance with attached terms and specifications until the Government's removal schedule warrants shipment.
- (d) Be responsible for all seedlings produced for the Government until the seedlings are delivered to the Government.
- (e) Provide all necessary equipment and labor to deliver and unload seedlings.
- (f) Provide the Government with an inventory of live seedlings by lot as of January 1, 1987, and an estimated inventory of shippable seedlings as of March 1, 1987.
- (g) Meet all Government handling and shipping schedules and requirements for removal, packing, loading, and delivery.
- (h) Maintain seed lot identification throughout the entire life of the contract. The BLM code must be cross-referenced to a nursery lot code number. All trays must have an identifying number.
- (i) Provide cold storage for seedlings after packing for up to one week.
- (j) Provide fiberboard paper boxes for packaging and shipping seedlings. (See Section D, Paragraph 1(d) for specifications.)
- (k) Have the capability to pack and have ready for delivery 90M Bitterbrush seedlings within seven (7) calendar days after notice.
- (l) Deliver seedlings.

4.0 SOIL MEDIA

- (a) A 1:1 potting mixture of sphagnum peat moss and a coarse (approximate grade #2) vermiculite may be used for potting medium in containers. The plug formed by the roots and potting medium must remain intact when pulled out of the cavity and must be firm enough to remain intact during normal handling associated with the seedlings planting operation.

SECTION C
DESCRIPTION/SPECIFICATIONS/WORK STATEMENT
(continued)

- (b) Minimum container size is 10 cubic inches per plant.
- (c) Potting medium must be sterile, and when damp (50% to 60% moisture content) and firmly packed, completely fill the container to within 3/8" of the top.
- (d) Soil pH shall be maintained between 5.0 and 8.0 for container grown seedlings.

5. SOWING SPECIFICATION

The Contractor will sow enough seed to fulfill the contract within three days of receipt of the seed. The Contractor will notify BLM of any seed not sown. The seed must not be "high-graded" before sowing. However, the Contractor may size sort, and divide the seed and then sow each portion in a different manner. Contractor must keep separate the Shoshone, Boise, and any other specified seed lots.

6. FUNGICIDE

Spray periodically with fungicide "benlate" when the first leaves come out. Treat seedlings with at least two types of fungicides for Botrytis control, following label directions.

7. ROOT PRUNING

Root elongation beyond the bottom of the containers will be restricted by growing seedlings in a manner which will provide air pruning of the root.

8. CONTAINERS

Minimum container size is 10 cubic inches per plant. Containers shall be of materials proven to stand up under greenhouse and shadehouse conditions. This includes polystyrene, polyethylene plastic, or other materials. Polystyrene or polyethylene containers must be constructed of a minimum 15 mil. thickness.

9. CONDITIONING

- (a) Seedlings must be acclimatized to ambient conditions while holding them in a greenhouse for a minimum period of six (6) weeks prior to shipping. This may include reducing the amounts of water and fertilizer and also exposing the seedlings to ambient air temperatures, but not freezing temperatures. The root plug must be moist at the time of delivery.
- (b) Seedlings shall not be subjected to temperatures of less than 32°F. at any time during the period of this contract.

SECTION C
DESCRIPTION/SPECIFICATIONS/WORK STATEMENT
(continued)

10. SEEDLING SPECIFICATIONS

- (a) Minimum Acceptable Sizes and Conditions - Bitterbrush:

<u>Type Seedling</u>	<u>Stem Height</u>	<u>Diameter</u>
Bitterbrush, 10 cubic inch containers	13 cm	1-2 mm

- (b) Stem - Containerized Seedlings. Seedlings shall be of good quality as evidenced by absences of root, stem or top deformity, mechanical damaged, disease, mold, insect or animal damage, and absences of chlorotic or short abnormal "bottlebrush" leaves. All gradeable (seedlings meeting specifications) and shippable seedlings must have 100 percent of the top capable of photo-synthesis. All defects lessening the vigor and predictability of a seedling to survive and grow shall be classed as a cull.

Only one live seedling per container cavity is permitted. Seedlings may not be so spindly that they are unable to support themselves individually in an upright position.

- (c) The roots must completely fill the container. The root mass and soil media shall remain intact when pulled out of the cavity, and remain intact during normal handling associated with seedling planting operations. The seedling must be capable of being withdrawn from the container without being damaged.

11. SEEDLING MEASUREMENT STANDARDS

- (a) Height will be measured from the soil media surface to the tip of the terminal to the nearest centimeter.
- (b) Stem caliper will be measured at a point not less than 5mm above the soil media surface to the nearest millimeter. Stem will be measured where the stem is round, no measurement will be taken at an interval swelling.

12. RECORDS

The Contractor shall currently maintain and provide the Government, upon request, a current record by dates, listing cultural work undertaken for this contract. Such records shall include date of sowing, amounts and dates of fertilizing, fungicide treatments, and temperatures maintained during germination and conditioning for hardening off.

SECTION C
DESCRIPTION/SPECIFICATIONS/WORK STATEMENT
(continued)

13. SEEDLING DELIVERY DATE

Seedlings are to be hardened off and ready for first delivery by March 11, 1987. Depending on spring planting conditions, the Government may extend the delivery dates up to 30 days at no additional cost to the Government.

Supplemental Specifications - Containerized Seedling Data

<u>Items and Species</u>	<u>Estimated No. of Seed Lots</u>	<u>Estimated No. of Seedlings</u>	<u>Seedlings Pulled From Container</u>
Bitterbrush	2	90 M	All

SECTION D
PRESERVATION/PACKAGING/PACKING

1. PACKING AND REMOVAL

- (a) The Bureau of Land Management will notify the Contractor of seedling requests at least seven (7) days prior to the planned date of pick up or delivery at the nursery. When the Bureau of Land Management desires removal of seedlings under production, it will order such removal by letter. This order will specify, by lot, quantities and date seedlings are to be ready for shipment. Telephone orders may be made, but must be followed by a written order. A telephone order will be documented in BLM files and the seven (7) day delivery requirement shall commence upon completion of the telephone order call.
- (b) Seedlings will not be packed until requested by Bureau of Land Management's representative or a mutually agreeable packing date.
- (c) Seedlings shall be watered and treated with fungicides four days before packaging.
- (d) All seedlings will be packaged in boxes meeting specifications shown below.

SPECIFICATIONS ON FIBERBOARD CONTAINERS

Style: Full overlap top and bottom, without hand holes.

Board: 250 lb. (minimum) to 275 lb. (maximum) test rigid when wet, poly wax curtain coat both inside and outside of box, full wax impregnated corrugated core. (A completely wax impregnated box not acceptable.)

Joint: Stitch. (Glued joints not acceptable)

Size: 30"L x 12"W x 16"H outside measurement (maximum size).

- (e) Boxes will be labeled identifying seedlings by Bureau lot number and date seedlings were packaged, and Nursery name.

2. STORAGE

- (a) Contractor will place packed seedlings promptly into cold storage facilities that meet the following criteria.
 - 2.1.1 33-36°F temperature
- (b) Boxes will be arranged in such a manner as to prevent crushing, smothering, heating, or other physical damage.
- (c) Contractor will provide cold storage for a maximum of seven (7) days after packaging.

SECTION E
INSPECTION AND ACCEPTANCE

1. 52.252-02 CLAUSES INCORPORATED BY REFERENCE (APR 1984)

This contract incorporates the following clauses by reference, with the same force and effect as if they were given in full text. Upon request, the Contracting Officer will make their full text available.

I. FEDERAL ACQUISITION REGULATION (48 CFR CHAPTER 1) CLAUSES

52.246-02 Inspection of Supplies - Fixed Price (JUL 1985)

2. PERIODIC INSPECTION

(a) Work will be subject to periodic inspections by the Contracting Officer's Representative (COR) or his representative to assure satisfactory progress to be certain that work is being performed in accordance with contract specification, and to determine if work corrections are necessary. The Contractor or his representative is encouraged to observe inspections and will receive inspection summaries upon request (See Section M for mileage restrictions on inspections).

3. FINAL INSPECTION

- (a) Final inspection and acceptance of all services to be delivered under this contract shall be the responsibility of the Contracting Officer. Quality of work is subject to verification by the COR with final payment to be withheld pending completion of any necessary rework by the Contractor.
- (b) The Contractor will not be granted a time extension to perform work correction required as a result of a periodic or final inspection if such correction is necessary because of improper work by the Contractor. The Contractor or his authorized representative must be at the worksite at the time of final inspection

4. ACCEPTANCE OF WORK

Acceptance of work will be determined by the Contractor's compliance with the specifications of this contract as observed by the COR. Only the Contracting Officer is authorized to make final acceptance of all deliverables.

United States
Department of
Agriculture

Forest
Service

Deschutes
National
Forest

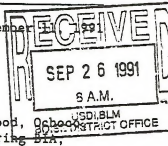
Bend Pine Nursery
.63095 Deschutes Market Rd.
Bend, OR 97701

Reply to: 2470

Date: September 11, 1991

Subject: Seedling Inventory - Bend Pine Nursery

To: Forest Supervisor; Deschutes, Fremont, Malheur, Mt. Hood, Ochoco, Umatilla, Wallowa-Whitman, Wenatchee, Winema; Warm Springs, Boise-BLM



Your seedling inventory information is being mailed to the Forest Silviculturist. If you have access to a Data General computer the information will be mailed electronically in the INVORD database structure, otherwise a hardcopy will be mailed. The Forest Silviculturist has the INVORD documentation and can run reports from the data.

The 1-0 inventory reported is a gross value. The net shippable as a 2-0 will typically be 70% of the 1-0 gross (+/-10%).

The 2-0 inventory Net value (+/-10%) is based on standard specifications of 10.2 cm in height and 4 mm caliper.

Net information for seedlings to be processed for 1-0 ship will be sent out in early October after they are inventoried.

You will note that for the most part our 2-0's are shorter than last year. In conjunction with our root culturing program, we experienced slow height growth during this year's cold spring. We also continue to have shorter heights within our Lodgepole Pine and Ponderosa Pine in block 10.

We continue to work with our nursery sowing factors and we are seeing some positive results. Where historically our gross 1-0 inventory was at least 2 times (or greater) of the requested amount, you will note that this ratio is significantly lower this year. We anticipate a further reduction as we continue to fine tune the nursery sowing factor (NSF) based on improved germination, reduced 1-0 mortality, and decreased cull in the packing shed.

If you have questions concerning the inventory, call Mahlon Hale at 388-5646 or FTS 422-6646. For questions concerning packing requests, call Nita Rauch at 388-7441 or FTS 422-6441. For computer questions concerning INVORD, call Becky Layton at 388-7481 or FTS 422-6481.


ORLANDO CONZALES
Nursery Manager

BEND PINE NURSERY
Seed/Sowing Information

Tree Lot: 66-91119A

Source: 001-BITTERBRUSH (BLM-BOISE)
Seed Lot: 6689-01

Germ: 80

Purity: 99

Gross Seeds:

Viable Seeds/lb: 16480

Survival

Cull factor

Oversow factor

Nursery Factor

0.33

1.55

0.10

5.00

Adjusted Request: 16.3M

Pounds Needed

Pounds Available

Pounds Remaining

4.96

4.96

0.0

District comments: Specs: Tops - No Limit, Roots - 16" max

Nursery comments: ORDERED BY SAM MATTISE THRU O.GONZALES 6/3/91

BEND PINE NURSERY
1-0 SEEDLING INVENTORY CALCULATIONS

PLOT SIZE
1' X 4' = 1
1/2' X 4' = 2

TL# 66-91119A DATE 91/09/23 ORIGINAL REQ 16.3
001-BITTERBRUSH (BLM-BOISE) ADJUSTED REQ 16.3

BLK:SEC:BED	TREES/PLOT X	PLOT SIZE - LT/BF	X BF	GROSS VOL.(M)	SHIP X FACTOR	NET VOL.(M)	
5: 8: 7	347 / 6	2	115.67	261.0	30.2	51	15.4
5: 8: 8	164 / 3	2	109.33	126.0	13.8	51	7.0
TOTAL	511 / 9 X 2	-113.56	X 387	= 43.9 X	51*	=	22.4

LIVE TREES/SQ. FT. = 28

INVENTORY PLOT NEEDS

STATISTICS

PREScribed ACCURACY STD.	10 %	MEAN	56.7778
COEFFICIENT OF VARIATION	20.8%	STANDARD DEVIATION	11.8
PERCENT SAMPLE NEEDED	.52	CALCULATED ACCURACY	6.9%
NUMBER OF 1/2' X 4' PLOTS NEEDED	4	COEFFICIENT OF VARIATION	20.8%
PLOT SPACING	129.0 ft.	ACTUAL % SAMPLE	1.16
INDENT SPACING	5	SUM OF X'S	511
		SUM OF X^2'S	30129
		MEAN RANGE	51.10 - 62.46

AVERAGE HEIGHT

AVERAGE DIAMETER

ALL TREES 15.2cm
SHIPPABLE TREES 15.6cm

ALL TREES 2.9mm
SHIPPABLE TREES 3.1mm

SHIPPING FACTOR [53.6+.50(.0)] X.95= 51*

TREFLOT # 66-91119A

DIAMETER STATISTICS

MEAN (GROSS) 3.0mm
CALCULATED ACCURACY 4.9%
ACTUAL % SAMPLE TAKEN .06%
COEFFICIENT OF VARIATION 25.8%
NUMBER OF TREES SAMPLED 28

HEIGHT STATISTICS

MEAN (GROSS) 16.2cm
CALCULATED ACCURACY 3.7%
ACTUAL % SAMPLE TAKEN .06%
COEFFICIENT OF VARIATION 19.4%
NUMBER OF TREES SAMPLED 28

DISCREPANCY-# OF TREES ENTERED IS 28
SHOULD BE IN THIS RANGE: 103.5 - 126.9

COMPOSITE STANDARD ERROR OF ESTIMATE
(HEIGHT AND COUNT) - 7.84%

TREELOT # 66-91119A

LIST OF GROSS TREES BY DIAMETER AND HEIGHT

SIZE CLASSES *	CALIPER IN mm							
* ht. cm. (in) *	1.0	1.5	2.0	2.5	3	3.5	4+	*

* 1-2 (<0.75) *	.0	.0	.0	.0	.0	.0	.0	*

* 3 (1.13) *	.0	.0	.0	.0	.0	.0	.0	*

* 4 (1.5) *	.0	.0	.0	.0	.0	.0	.0	*

* 5-6 (2-2.25) *	.0	.0	.0	.0	.0	.0	.0	*

* 7-8 (2.75-3) *	.0	.0	.0	.0	.0	.0	.0	*

* 9-10 (3.5-4) *	.0	.0	3.6	.0	3.6	.0	.0	*

* 11-12(4.2-4.7) *	.0	.0	3.6	3.6	7.1	.0	.0	*

* 13+ (5+) *	.0	.0	14.3	.0	10.7	.0	7.1	*

* * * * *								

BLM LIBRARY
SC 653 BLDG. 50
DENVER FEDERAL CENTER
P. O. BOX 25047
DENVER, CO 80225-0047

BLM LIBRARY
SC-653, BLDG. 50
DENVER FEDERAL CENTER
P. O. BOX 25047
DENVER, CO 80225-0047

QL 94.2 .L353 no.94-8

Bitterbrush rehabilitation ;
Squaw Butte fire complex

BUREAU OF LAND MANAGEMENT

Idaho State Office
3380 Americana Terrace
Boise, Idaho 83706

BLM-ID-PT-94-022-4070